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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,326	11/18/2003	Thomas W. Stone	10020908-1	8276

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EXAMINER

HUGHES, JAMES P

ART UNIT PAPER NUMBER

2883

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/717,326	Applicant(s) STONE, THOMAS	
	Examiner James P. Hughes	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed October 17, 2005 have been fully considered but they are not persuasive. Applicant arguments regarding the incorporation of reflection system of Bouevitch into Applicants invention are moot as the rejections do not rely on this combination. Applicant argues that “there is not motivation to modify Bouevitch by replacing the conventional mirrors with holographic mirrors” with the claimed properties. (See the top of page 15 and page 18 of the amendment) This argument is not persuasive because Bouevitch teaches that “other modifying means 150 including at least one optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated are possible.” (See paragraph 75)

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ such a holographic mirror (or volume phase hologram as they are art-recognized equivalents) in the intentions of Bouevitch because a holographic mirror is an “optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated” as taught by Bouevitch. One of ordinary skill in the art at the time of the invention would have been motivated to employ a holographic mirror because they provide an efficient means for diffractive reflection with a lack of added dispersion. This property is well know and taught for example by Stone 6,072,923 – see e.g. Col. 4, ll. 5-10) Furthermore, as taught by Stone ‘923 (see e.g. Col. 6, ll 13-23) and identified by applicant (see e.g. the last two lines of page 8 and

Art Unit: 2883

first two paragraphs of page 9 of the amendment) such diffractive reflection systems are holographic mirrors. Additionally, a holographic mirror is well known (as applicant asserts on pages 8 and 9 of the amendment when arguing that the amended claim limitations do not constitute new matter) to have the property that “a direction of propagation of said distinct chromatic components is altered by means of diffraction by said holographic mirror; whereby, in reflecting said distinct chromatic components by means of diffraction, an angle of incidence does not equal an angle between a direction of propagation of said reflected distinct chromatic components and a normal to a surface of said holographic mirror, said reflected distinct chromatic components emanating from said surface” as claimed.

Regarding claim 21, applicant further argues that Bouevitch does not teach a conjugate mirror. (See page 16-17 of the amendment) This argument is not persuasive because as discussed above, Bouevitch teaches that “other modifying means 150 including at least one optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated are possible.” (See paragraph 75) Thus, the modifying means (150) is the same as what applicant asserts (see pages 15-17 of the amendment received on October 17, 2005) is well known in the art as the function of a conjugate mirror. (See e.g. Paragraphs 92-96 and Figs 6A and 7 of Bouevitch for a further discussion on possible properties of the modifying means 150)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-13, 18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouevitch (U.S. Patent Publication No. US 2003/0021526) in view of Stone (6,072,923).

Regarding claims 1 and 3, Bouevitch discloses a method for compensating for a chromatic dispersion in optical system comprising the steps of: separating input optical radiation into chromatic components', propagating the chromatic components through the optical system by reflecting the chromatic components from a modifying means, such as a switchable pixilated mirrors, and providing a pre-selected relationship between optical path lengths of the chromatic components, the pre-selected relationship compensating the chromatic dispersion, and recombining the chromatic components after propagating through the optical system (paragraphs (0003), (0061) and (0086)). Bouevitch discloses that the modifying means may include mirrors or any optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light (paragraph [0075]).

Bouevitch does not specifically disclose reflecting the chromatic components from a holographic mirror having reflection properties different from a conventional mirror; wherein, in reflecting said distinct chromatic components, a direction of propagation of said distinct chromatic components is altered by means of diffraction by said holographic mirror; whereby, in reflecting said distinct chromatic components by means of diffraction, an angle of incidence does

not equal an angle between a direction of propagation of said reflected distinct chromatic components and a normal to a surface of said holographic mirror, said reflected distinct chromatic components emanating from said surface. However, Bouevitch teaches that “other modifying means 150 including at least one optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated are possible.” (See paragraph 75)

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ such a holographic mirror (or volume phase hologram as they are art-recognized equivalents) in the intentions of Bouevitch because a holographic mirror is an “optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated” as taught by Bouevitch. One of ordinary skill in the art at the time of the invention would have been motivated to employ a holographic mirror because they provide an efficient means for diffractive reflection with a lack of added dispersion. This property is well know and taught for example by Stone 6,072,923 – see e.g. Col. 4, ll. 5-10) Furthermore, as taught by Stone ‘923 (see e.g. Col. 6, ll 13-23) and identified by applicant (see e.g. the last two lines of page 8 and first two paragraphs of page 9 of the amendment) such diffractive reflection systems are holographic mirrors. Additionally, a holographic mirror is well know (as applicant asserts on pages 8 and 9 of the amendment when arguing that the amended claim limitations do not constitute new matter) to have the property that “a direction of propagation of said distinct chromatic components is altered by means of diffraction by said holographic mirror; whereby, in reflecting said distinct chromatic components by means of diffraction, an angle of incidence

Art Unit: 2883

does not equal an angle between a direction of propagation of said reflected distinct chromatic components and a normal to a surface of said holographic mirror, said reflected distinct chromatic components emanating from said surface” as claimed.

Regarding claims 4-7, Bouevitch discloses that the method further comprises the steps of: focusing the input optical radiation, propagating the input optical radiation through at least one separating diffraction grating, and propagating the chromatic components through at least one recombining diffraction grating (Fig. 1b, and paragraphs (0061) and (0102)). Further, Bouevitch discloses that the at least one recombining diffraction grating is the same as the at least one separating diffraction grating (Fig. 1b, and paragraph (0061)).

Regarding claims 8 and 11, Bouevitch discloses a chromatic dispersion compensated optical system comprising: an optical separating sub-system (120) capable of separating input optical radiation into chromatic components, an optical recombining sub-system (120) capable of recombining the chromatic components for output, and an optical reflector, such as a pixilated switchable mirrors, capable of reflecting the chromatic components and providing a pre-selected relationship between optical path lengths through the optical systems of the chromatic components, the pre-selected relationship compensating chromatic dispersion, the optical reflector being optically disposed between the optical separating sub-system and the optical recombining sub-system (Fig. 1b, and paragraphs 10003) and 10061)).

Bouevitch does not specifically disclose that the optical reflector is a volume holographic mirror having reflection properties different from a conventional mirror; wherein, in reflecting said distinct chromatic components, a direction of propagation of said distinct chromatic

Art Unit: 2883

components is altered by means of diffraction by said holographic mirror; whereby, in reflecting said distinct chromatic components by means of diffraction, an angle of incidence does not equal an angle between a direction of propagation of said reflected distinct chromatic components and a normal to a surface of said holographic mirror, said reflected distinct chromatic components emanating from said surface. However, Bouevitch teaches that “other modifying means 150 including at least one optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated are possible.” (See paragraph 75)

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ such a holographic mirror (or volume phase hologram as they are art-recognized equivalents) in the intentions of Bouevitch because a holographic mirror is an “optical element capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated” as taught by Bouevitch. One of ordinary skill in the art at the time of the invention would have been motivated to employ a holographic mirror because they provide an efficient means for diffractive reflection with a lack of added dispersion. This property is well know and taught for example by Stone 6,072,923 – see e.g. Col. 4, ll. 5-10) Furthermore, as taught by Stone ‘923 (see e.g. Col. 6, ll 13-23) and identified by applicant (see e.g. the last two lines of page 8 and first two paragraphs of page 9 of the amendment) such diffractive reflection systems are holographic mirrors. Additionally, a holographic mirror is well know (as applicant asserts on pages 8 and 9 of the amendment when arguing that the amended claim limitations do not constitute new matter) to have the property that “a direction of propagation of said distinct

Art Unit: 2883

chromatic components is altered by means of diffraction by said holographic mirror; whereby, in reflecting said distinct chromatic components by means of diffraction, an angle of incidence does not equal an angle between a direction of propagation of said reflected distinct chromatic components and a normal to a surface of said holographic mirror, said reflected distinct chromatic components emanating from said surface” as claimed.

Regarding claims 9, 10, 12, 13, 18, and 21, Bouevitch discloses that the optical system further comprises a switchable liquid crystal array (130 and 527) interposed between the reflector and the optical recombining sub-system (paragraph [0085]), an optical focusing component (990) capable of focusing separated input optical radiation onto the volume optical reflector, a directing optical element (110b) capable of directing the separated input optical radiation to the optical reflector, and a redirecting optical element capable of redirecting optical radiation reflected from the optical reflector to the switchable element (144 and 14) (Figs. 1b, 3a, 3b, 5a, and 9). Further, Bouevitch discloses that the optical recombining sub-system is the same as the optical separating sub-system (Fig. 1b, and paragraph [0061]). It is also taught that the volume optical reflector may comprise a phase conjugate mirror (610 in Fig. 6a, or the holographic mirror discussed above) because as Bouevitch teaches “other modifying means 150 including at least one optical element [e.g. the holographic mirror] capable of modifying a property of at least a portion of a beam of light and reflecting the modified beam of light back in substantially the same direction from which it originated are possible.” (See paragraph 75) This may comprise a conjugate mirror as asserted by applicant because this function is well known in the art as the function of a conjugate mirror. (see pages 15-17 of the amendment received on

Art Unit: 2883

October 17, 2005) (See e.g. Paragraphs 92-96 and Figs 6A and 7 of Bouevitch for a further discussion on possible properties of the modifying means 150)

3. Claims 14-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouevitch in view of Shirasaki et al. (U.S. Patent Publication No. US 2002/0114090, herein after "Shirasaki"). Bouevitch teaches a method and apparatus for compensating for a chromatic dispersion in optical system as discussed above.

Regarding claims 14, 15, 19, and 20, Bouevitch does not disclose that the optical system comprises a pair of separating diffraction gratings and a pair of recombining diffraction gratings.

Shirasaki discloses a spatial grating pair arrangement including a pair of separating diffraction gratings (68 and 71) used to compensate for chromatic dispersion. (Fig. 6, and paragraph [0015]). It would have been obvious to modify Bouevitch to include a pair of separating diffraction gratings such as that taught by Shirasaki. The motivation would have been to provide additional compensation for chromatic dispersion.

Additionally, since the separating diffraction grating is the same as the recombining diffraction grating in Bouevitch, the combination of Bouevitch and Shirasaki also discloses that the optical system comprises a pair of the recombining diffraction gratings.

Regarding claims 16 and 17, Bouevitch discloses that the optical system further comprises an optical focusing component (990 in Fig. 9) capable of focusing separated input optical radiation onto the volume optical reflector and that the recombining diffraction grating is the same as the separating diffraction grating (Fig. 1b, and paragraph (0061)).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Conclusion

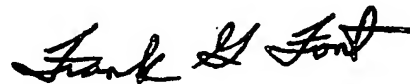
Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P. Hughes whose telephone number is 571-272-2474. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2883

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James P. Hughes
Patent Examiner
Art Unit 2883



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